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Iran Nuclear Brief
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The November 2012 IAEA Report on Iran and Its Implications

The new quarterly report from the International Atomic Energy Agency (IAEA) on Iran's nuclear program, which is now in circulation, finds that Tehran has continued to install more centrifuges for uranium enrichment at its underground complex at Fordow. The November 16 IAEA report says that Iran has installed an additional 644 centrifuges at Fordow and 991 at Natanz, both of which are regularly inspected by the Agency.

However, the total number of operating centrifuges at Fordow (696) has not yet increased, according to the Agency. The IAEA report also notes that while Iran continues to experiment with advanced and more efficient types of centrifuges, it is not yet using them for production-scale operations.

The IAEA also reports that Iran has continued enriching uranium to the 20% level at the previously reported rate and that its stockpile of 20% material has increased moderately—by 43 kg. According to the IAEA's November report, Iran has produced 232 kg of 20% material, of which 96 kg was converted or slated for conversion to uranium oxide powder, ostensibly for the production of fuel plates for its Tehran Research Reactor. This leaves a stockpile of 134.9 kg of 20% enriched uranium in hexafluoride form. In August, the IAEA reported that Iran had produced 189.4 kg of 20% enriched uranium, of which 91 kg was stockpiled as hexafluoride.

HIGHLIGHTS

- Iran's stockpile of 20% enriched material, if further enriched to weapons-grade, is still short of the amount necessary for one nuclear weapon.
- Iran has completed installation of the centrifuges that its underground enrichment facility, Fordow, is designed to hold, but the number of operating centrifuges remains unchanged since the last IAEA report.
- The IAEA report confirms that Iran has not made significant progress on its advanced centrifuges, which are still not ready for full-scale use.
- Construction on the Arak heavy water reactor continues, but Iran pushed back the date that it expects to begin operations at the facility from the third quarter of 2013 to early 2014.
- The IAEA is still investigating possible military dimensions of Iran's nuclear activities and has been unable to reach an agreement with Tehran on a framework for resolving the outstanding concerns.
- There is still time for a negotiated resolution to Iran's controversial nuclear program, if the P5+1 and Iran both exercise greater flexibility and creativity and agree to address the most pressing concerns of each side.

Iran would need to produce approximately 220-250kg of 20% material and enrich it further to 90% U-235, to have enough bomb-grade material for one nuclear bomb.

The report also reiterates the Agency's inability to reach agreement with Tehran on a "structured approach" to resolving outstanding questions regarding potential military dimensions to Iran's program that were cited in the Agency's Nov. 2011 report. The IAEA's latest report also notes that Iran continues with construction of a heavy water reactor at Arak, which Iran claims will be completed by the first quarter of 2014.

Taken together, the IAEA report findings provide further troubling evidence that Iran is continuing to pursue sensitive nuclear fuel-cycle activities in violation of UN Security Council resolutions and is slowly enhancing its nuclear weapons breakout potential.

However, Iran remains years, not months away from having a workable nuclear arsenal if it were to choose to pursue that capability. Given this reality, it is clear that new and more energetic diplomatic efforts are necessary to reduce the risk of a nuclear-armed Iran.

The following is a brief summary of key findings from the November 2012 IAEA report and further analysis on the implications for talks to resolve the crisis.

Still Short of a Bomb's Worth of 20% Enriched Material

According to the November 2012 IAEA report, Iran has produced a total 232 kg of uranium enriched to 20%, 43 kg of which was produced since the August 2012 report.

However, not all of the material enriched to 20% is readily available for further enrichment, should Tehran decide to do so. According to the November 2012 IAEA report, Iran has set aside 96 kg for conversion from uranium hexafluoride gas to uranium oxide, a powder used to manufacture fuel plates for the Tehran Research Reactor. Of the 96 kg, 82.7 kg has "been fed into the conversion process." However, the IAEA report indicates that none of the additional 43 kg of 20% material produced since August has been slated for conversion.

While uranium in the form of fuel plates can be converted back to its gaseous form, this process would take several months. It is unlikely that Iran could engage in this activity without the Agency's knowledge.

This leaves Iran with a stockpile of 134.9 kg of 20% material that would be readily available should Tehran decide to pursue nuclear weapons. This is an increase of about 43 kg from the Agency's August 2012 report.

Of the remaining stockpile, Iran is still well short of the estimated 225-250 kg of uranium enriched to 20% that, when further enriched to weapons-grade, would be enough for one nuclear weapon. Iran is unlikely to take the dramatic step of breaking out of the nuclear Nonproliferation Treaty (NPT) until it had enough 20% material for several bombs – a point that would still be several years away at the rate Iran currently is enriching. Additionally, producing enough weapons-grade uranium for a weapon is only one step toward a nuclear arsenal. Iran would likely need more time to produce and test a nuclear warhead and arm its ballistic missiles.

However, reaching the mark of "one bomb's worth" of uranium enriched to 20% became more significant earlier this fall, when Israeli Prime Minister Benjamin Netanyahu told the UN General Assembly on September 27 that Israel might strike Iran's nuclear facilities before Tehran's enriched uranium stockpile reaches that level.

According to the November 2012 IAEA report, Iran also has produced 7,611 kg of 3.5% enriched uranium. This is an increase of 735 kg more than the August report. Of the 7,611 kg, 5,303 kg is available, the remainder having already been used as feed for producing 20% material.

This stockpile is virtually unchanged from the August report, which noted Iran's stockpile of 3.5% material at 5,309 kg. This material, if further enriched, could be used to make several nuclear devices, but it would take Iran more time compared to using its stock of 20%-enriched uranium. If Tehran were to decide to "break out" and race to build a bomb, it would probably do so using its stockpile of 20% enriched uranium.

New Centrifuges at Fordow: More Installed, but Not All Operational

The IAEA reported that 644 additional centrifuges have been installed at Fordow since the August 2012 report, bringing the total number of centrifuges at the facility to 2,784, its estimated maximum capacity. The continued installation of centrifuges there is a troubling indication that Iran could soon increase its uranium enrichment production at its most secure facility.

Fordow has two enrichment halls, Unit 1 and Unit 2, each of which is configured for 8 cascades of 174 IR-1

Adel Pazzyar/IRNA/AP

IAEA Director-General Yukiya Amano, left, with Iran's Ambassador to the IAEA, Ali Asghar Soltanieh, in May 2012.

centrifuges. According to the November IAEA 2012 report, both Unit 1 and Unit 2 have 1,392 centrifuges, although only 696 in Unit 2 are operating. The report found that the remaining 4 cascades in Unit 2 have been subjected to vacuum testing, which is a preliminary step toward operating the centrifuges.

No Significant Progress on Advanced Centrifuges

Iran has been testing its second-generation centrifuge models for several years, but the November 2012 IAEA report confirms that those machines are still not ready for full-scale use. The Agency noted, however, that Iran has been intermittently feeding natural uranium into IR-2m and IR-4 centrifuges. No 3.5% enriched uranium has been withdrawn, according to the IAEA report. Independent assessments of Iran's program suggest that Iran's ability to mass-produce these more advanced centrifuges is uncertain, due in part to international sanctions that prevent Tehran from easily acquiring the necessary materials.

Arak Reactor Construction Continues

The IAEA also reported that Iran is continuing to move forward with work on the Arak heavy water reactor, despite UN Security Council resolutions calling on Tehran to halt construction. Since the August 2012 report, the IAEA found that Iran was continuing to install cooling and moderator circuit piping. The previous IAEA report of Aug. 2012 noted the same finding.

The November report now says that Iran claims the reactor will become operational in the first quarter of 2014, although significant delays and impeded access to necessary materials make this assertion questionable. Previously, Iran said that the Arak reactor would begin operations between July and September of 2013.

Experts assess that if Arak functions at optimal capacity, it could produce sufficient plutonium to yield 9 kg annually, after separation, enough for approximately 1.5 nuclear weapons. Iran does not yet have a reprocessing facility for separation, and in May 2004 Iran revised its IAEA declaration on Arak,

eliminating plans for a facility that could be used for those purposes. Tehran maintains that it does not intend to build a plant to separate plutonium from the irradiated fuel that the reactor will produce.

Possible Military Dimensions Still Being Investigated by IAEA

As has been widely and previously reported, the IAEA finds that Iran still is not fully cooperating with the Agency's investigation into the potential military dimensions of Iran's nuclear activities. The November 2012 report does not indicate any new evidence or information regarding possible military dimensions of Iran's nuclear program, which were detailed in the IAEA's November 2011 report. The August 2012 report said that the agency found "more information which further corroborates the analysis contained in the aforementioned Annex [from the November 2011 report]."

Shortly after the August 2012 report was released, the IAEA Board of Governors passed a resolution on September 13 calling on Iran to "immediately conclude and implement" an agreement to resolve "outstanding issues related to possible military dimensions" of past nuclear activities.

Since early 2012, the IAEA and Iran have been discussing a way forward—through a "structured approach"—for the agency to investigate these alleged activities, but have been unable to reach an agreement. The new IAEA report confirms that representatives from both parties will meet again on December 13.

Time and An Opportunity for a Diplomatic Resolution

In 2007, the U.S. Intelligence Community had assessed that Iran had already gained a nuclear weapons capability—that is, "Iran has the scientific, technical and industrial capacity eventually to produce nuclear weapons if it decides to do so." Senior intelligence officials continue to assess that it has not made such a decision.

Once Iran accumulates enough 20%-enriched uranium to make a bomb, it would still take at least two months to enrich it further to weapons grade. If Iran started immediately enriching toward weapons grade from its existing 3.5%-enriched stockpiles, it would take several months to accumulate enough for a single bomb.

Because Iran's uranium enrichment facilities and uranium stockpiles are regularly monitored by the IAEA, it would be likely that any diversion of nuclear material for further enrichment would be detected long before it could be used to build a weapon.

Even if Iran had enough fissile material for a bomb, it would have to design a warhead, fashion the uranium hexafluoride gas into the metallic form needed for the warhead, and conduct an explosive test of that design to assure its reliability.

Therefore, Iran would require, not a few weeks, but many months to build a nuclear weapon and longer to build a deliverable arsenal. Secretary of Defense Panetta recently estimated that it would take 2-3 years, similar to the estimate from the International Institute for Strategic Studies.

If Iran were to move toward building nuclear weapons, it would need to expel IAEA inspectors, use existing facilities and stockpiles to produce weapons grade uranium, and probably test a nuclear device, all of which would raise the alarm to the international community.

Resolving the Standoff

Just days after his re-election, U.S. President Barack Obama said in a November 14 press conference that there is still a "window of opportunity" to use diplomacy to resolve the concerns over Iran's controversial nuclear program. Obama noted that, "there should be a way in which [the Iranians] can enjoy peaceful nuclear power while still meeting their international obligations and providing clear assurances to the international community that they're not pursuing a nuclear weapon."

The United States, its partner countries in the P5+1 (China, France, Germany, Russia, and the United Kingdom) and Iran must promptly resume negotiations aimed at ensuring that Tehran meets fully its nonproliferation obligations and halts activities suggesting a non-peaceful use of its nuclear program.

However, when talks resume, the parties cannot simply re-introduce the same proposals that failed to gain traction during the three rounds of negotiations that took place earlier this spring. While the proposals offered by the P5+1 and Iran cite similar steps, there are significant differences regarding the proposed sequence of those steps. New and creative approaches need to be considered that capitalize on common

ground and address the most pressing concerns of each side.

The overall goal for U.S. and P5+1 negotiators must be to halt the most significant proliferation risk, which is Iran's accumulation of 20% enriched uranium. Their efforts should focus on limiting—not permanently suspending—Iran's enrichment to normal power reactor-grade levels (3.5%), and limit its stockpiles to actual nuclear power needs, while securing more intrusive IAEA inspections to ensure that Iran has halted previous weapons-related experiments, all in exchange for a phased rollback of international sanctions on Iran.

One short-term confidence-building option would be a "suspension for suspension" arrangement, whereby Iran agrees to halt production of 20% enriched uranium and the P5+1 agrees to suspend any further sanctions on Iran. This could be a stop-gap measure that builds trust between the parties and prevents escalation of the situation to a dangerous and counterproductive military confrontation. The sides could then tackle the improvements in safeguard procedures that would justify endorsing Iran's contingent rights to uranium enrichment.

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